CLAIMS

1.   A sample carrier for a confocal microscope, comprising: a first coverslip and a second coverslip, wherein the second coverslip carries a mirror; wherein the mirror surrounds a sample region which is defined on the second coverslip; a frame which holds the first and the second coverslip and thereby provides a cavity between the first and the second coverslip; a medium filled in the cavity, which has approximately the same refractive index as the first and the second coverslip.

2.   The sample carrier as defined in Claim 1, wherein the substrate of the first and the second coverslip is made of anisotropic or isotropic materials that are transparent to the wavelengths used.

3.   The sample carrier as defined in Claims 1, wherein the first and the second coverslip are made of quartz glass; and the medium in the cavity is glycerol.

4.   The sample carrier as defined in Claim 3, wherein the distance between the first and the second coverslip is no greater than 50 μm.

5.   The sample carrier as defined in Claim 1, wherein the mirror on the second coverslip is made from a material that acts reflectively for light in a wavelength region between $\lambda = 300$ nm - 1300 nm.

6.   The sample carrier as defined in Claim 5, wherein the material of the mirror is aluminum or silver with a protective layer, or gold.

7.   The sample carrier as defined in Claim 5, wherein the mirror is made of a dielectric mirror coating.

8.   The sample carrier as defined in Claim 1, wherein the mirror is embodied as a circular ring around the sample region.

9.   The sample carrier as defined in Claim 1, wherein at least the first or the second coverslip is secured to the frame using a special adhesive.

10.   The sample carrier as defined in Claim 1, wherein the first and the second coverslip are in the shape of a circle.

11.   The sample carrier as defined in Claim 1, wherein the first and the second coverslip possess the shape of a polygon with sides of identical length.

12.   The sample carrier as defined in Claim 1, wherein the first and the second coverslip are in the shape of a rectangle.

13.   The sample carrier as defined in Claim 1, wherein the microscope is a interferometric fluorescence microscope, such as 4-pi microscope, standing wave field microscope, I^2M, I^3M, and I^5M microscope, and theta microscope.

14.   A method for fabricating a sample carrier, for a confocal microscope, comprising the steps:

- applying an aqueous solution, which contains the sample, onto a sample region of a second coverslip of the sample carrier; wherein a mirror is provided on the second coverslip and the mirror surrounds the sample region;
- drying the second coverslip in such a way that the water evaporates and the sample remains adhered to the sample region of the second coverslip of the sample carrier;
- applying onto the sample region a medium that corresponds substantially to the refractive index of the coverslip being used;

- fitting together a first coverslip and the second coverslip, in such a way that the sample is located in a cavity formed by the first and the second coverslip; and

- introducing the assembled first and second coverslip into a frame.

15. The method as defined in Claim 14, wherein at least the first or the second coverslip (32 or 33) is secured on the frame (35) using a special adhesive (36).

16. The method as defined in Claim 14, wherein the aqueous solution is applied as a droplet onto the sample region in such a way that the mirror is not wetted.

17. The method as defined in Claim 14, wherein the medium, which has a refractive index comparable to that of the coverslips, is applied on the sample from which water has been removed.

18. The method as defined in Claim 14, wherein an objective is arranged on each of the opposite sides of the sample carrier in such a way that an objective's optical axis extends through the sample region; and each objective is optically coupled via an immersion medium to the first and the second coverslip of the sample carrier.

19. The method as defined in Claim 14, wherein sample carrier is used for alignment purposes, wavefront equalization, phase equalization, path length equalization, and simple and rapid switchover between the mirror and sample region.